**The Case of the “Mystery Resistor” \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Wet Lab – Recipe Lab**

**Purpose:** In this activity, you will investigate the relationship between the electric current and the potential difference flowing through a mystery resistor and a load. By understanding this relationship, you will be able to solve the value of the resistor.

**Hypothesis:** As the electric current increases, we would expect the potential difference to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials:**

(6) Batteries Ammeter

(6) Connecting Wires Voltmeter

Resistor Bulb

Switchboard

**Method:**

1. Connect the circuit shown here.

|  |  |  |
| --- | --- | --- |
| Setting on Power Supply (V) | Potential Difference (V) | Electrical Current (A) |
| 0 |  |  |
| 3.0 |  |  |
| 6.0 |  |  |
| 9.0 |  |  |

1. Adjust the power supply to give the values shown in the following table. Record the potential differences and ammeter readings in the table.
2. Open the switch. Replace the resistor with the bulb. Repeat step 2.

|  |  |  |
| --- | --- | --- |
| Setting on Power Supply (V) | Potential Difference (V) | Electrical Current (A) |
| 0 |  |  |
| 3.0 |  |  |
| 6.0 |  |  |
| 9.0 |  |  |

**Observation:**

1. Draw a circuit diagram for this circuit.
2. Plot all of the values on ONE graph that shows the potential difference against current for the resistor and the bulb. Plot current (A) on the x-axis and the potential difference (V) on the y-axis. Use a different colour or plotting symbol for each set of data and draw the line of best fit.
3. Calculate the slope resistor. Show all your calculations and units.
4. For the bulb, calculate the resistances for each data point using Ohm’s Law.

**Discussion:**

1. What is the resistance of the resistor?
2. Describe the relationship between voltage and current for the resistor.
3. How does this relationship differ for the lightbulb? Is a lightbulb an ohmic resistor? Explain your answer.
4. What can you infer about the resistance of the lightbulb as the current through it increases?

**Conclusion:**

In a short paragraph, summarize three important scientific concepts demonstrated in this lab.